Addison-Wesley

Information Laboratory Software

Chemistry

Teacher's Guide

Addison-Wesley Publishing Company
Menlo Park, California • Reading, Massachusetts • New York
Don Mills, Ontario • Wokingham, England • Amsterdam • Bonn
Sydney • Singapore • Tokyo • Madrid • Bogotà • Santiago • San Juan

Contents

Overview of

Addison-Wesley Information Laboratory Software

Chemistry

Addison-Wesley Information Laboratory Software is a powerful research tool for students and teachers. Just one disk contains data on more than 60 elements and many applications related to topics presented in the *Addison-Wesley Chemistry* textbook. A menu driven program and help screens make the *Information Laboratory Software* easy to use.

The Information Laboratory is a dedicated data base of chemical data and applications linked to the periodic table.

- Provides research material that can be used throughout the course
- Provides easy to manage experiences searching a data base
- Enhances the understanding of periodicity by relating data and applications to the periodic table
- Provides information and relationships which encourage discovery and critical thinking

Blackline masters guide students through searches.

- Provide step by step instruction for searches
- Are a beginning point for projects and lead students to further research
- Individualize the software applications
- Stimulate higher level thought processes

Program features allow students to gather and print data.

- Documents student's searches
- Provides printed copies of the exact data collected for a report
- Provides printed material for review

Program Description

Components of the Addison-Wesley Information Laboratory Software: Chemistry

- Doubled-sided System/Data disk
- A backup disk
- Teacher's Guide with Tutorial
- Student searchsheets with answers

Hardware Requirements

- Any of the following Apple computers with 64K:
  Apple II ® Plus, IIe, IIc or IIGS™
- A single disk drive
- A black and white or color monitor
- A printer (optional). Only the Imagewriter II and some Epson models will print subscript notation.

Starting the Program

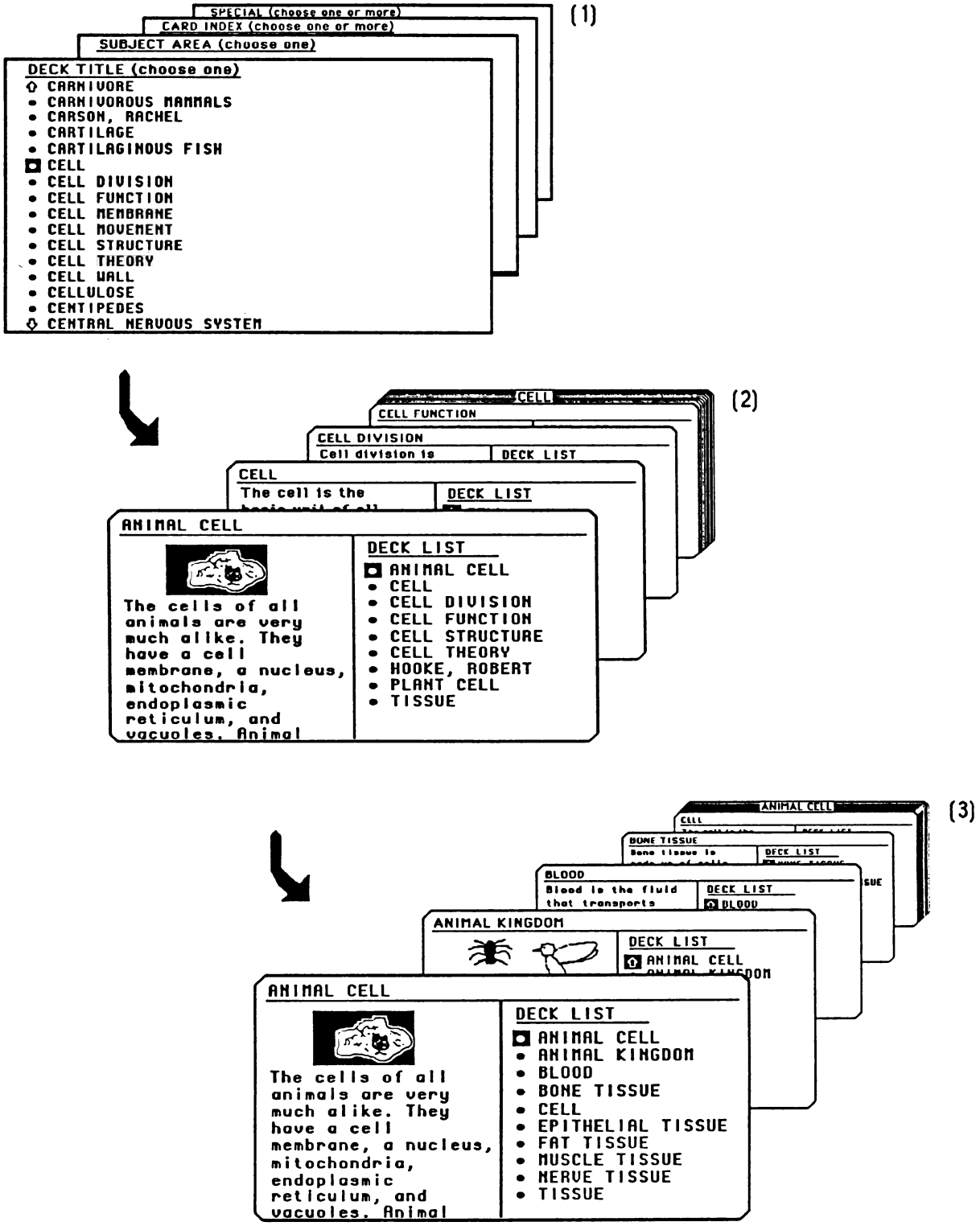
- Put the System Disk (Side 1) in the disk drive.
- Turn on the computer.

  Wait for the message: Remove Program, Insert Data Disk
  Press Return to Continue.
- Turn over disk (Side 2) and press **RETURN**.
- The data will be loaded into the computer and the SEARCH PATHS menu will appear.

Program Organization

The data in the Information Laboratory is organized in a dedicated data base related to a specific course of study. Information on several hundred topics is stored on a disk. Each topic is linked to other related topics. These conceptually linked topics are presented as a collection of reference cards organized into a deck. Searches start at the Search Paths menu, where there are four different ways to choose a topic. Once a topic is selected the deck of reference cards is available. Each topic in the deck becomes a path to another deck of related information. Students can follow or create countless paths. As they move from deck to deck paths may cross to create a rich web of information.

This illustration represents (1) the selection of a deck from a search path. The cards in the deck can be selected (2) for viewing or (3) for making another deck.
Note: The sample illustrated is from the Life Science data disk.
Other disks will not have the same information.

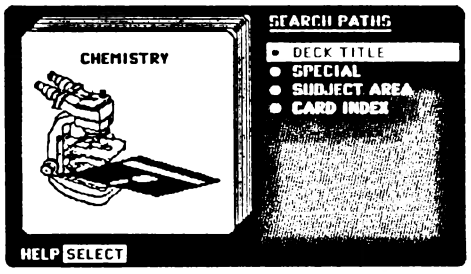


About the Search Paths

The Information Laboratory has four search paths. Each search path provides a starting point for an on-line search. The ↑ or ↓ moves the cursor up or down. The cursor highlights the path and **RETURN** selects the path.

The DECK TITLE search path is an alphabetical list of all of the topics in the data base. Pressing **RETURN** selects the topic next to the cursor. The deck will include related cards.

The SPECIAL search path is a list of elements in the data base arranged in groups like the periodic table. Data on the elements can be accessed by groups, periods, or the elements themselves. The **SPACEBAR** highlights selections and pressing **RETURN** selects the deck.

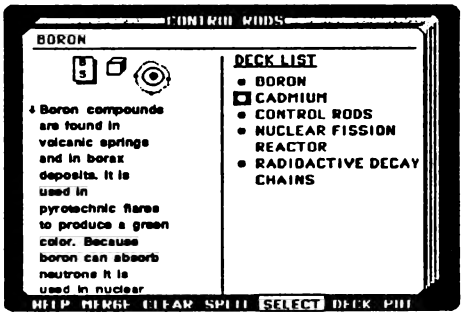


The SUBJECT AREA search path is a list of applications and disciplines that use chemical principles. The cursor indicates the subject area and pressing **RETURN** selects the subject as a deck of information.

The CARD INDEX search path shows the same list as the deck title list. However, these topics are not linked. Any number of information cards can be selected using the **SPACEBAR** to highlight them and pressing **RETURN**.

About Deck Lists

In each deck the DECK LIST provides access to the cards in that deck. The information on each card can be read by putting the cursor next to the desired title, highlighting SELECT on the menu at the bottom of the screen by using the → or ←, and pressing **RETURN.**



The DECK LIST also leads to other decks. New decks can be created from any card by putting the cursor next to the desired title, highlighting DECK on the menu at the bottom of the screen by using the → or ←, and pressing **RETURN.**

About the Tutorial

The Tutorial is included to initially guide the user through the program. Part 1 introduces the program and presents the most basic commands. Part 2 introduces other commands needed to complete the searchsheets. Students should complete these two sections before beginning their first searches. Part 3 introduces more advanced commands that many will find useful. Part 4 presents options for printing.

Program Use

Because it is a data base with much information, the obvious use of the *Information Laboratory for Chemistry* is for research. In addition, links between chemistry principles, applications, and the elements make the software useful for critical thinking and reinforcement assignments. The following features provided in the program and the Teacher's Guide can assist with assignments:

1. The SPECIAL search path provides access to sixty-five elements, each linked to descriptions of the elements and in-depth information on applications. From this path elements can be accessed individually, or by groups, or periods. This path allows for exploration of group or periodic trends. The teacher can tell students to use this search path to study, compare, or review properties of elements.

2. The SUBJECT AREA search path gives access to major applications of chemistry. This is a good starting place for an overview of chemistry applications. Each area leads to in-depth information on different aspects of chemical uses and the principles and elements used in these applications.

3. The DECK TITLE or CARD INDEX search paths give access to the topics listed on page T20 of the Teacher's Guide. Each topic card has information on concepts presented in the *Addison-Wesley Chemistry* textbook. These topics are linked to applications of these principles. Assignment of these topics provides review, reinforcement, and expansion of information presented in the text.

4. In a separate section of this teacher's guide a searchsheet is provided for each chapter of the *Addison-Wesley Chemistry* textbook. These searchsheets provide individual student direction for using the data base. The searches are designed to:

   - Lead to additional information on topics presented in the textbook
   - Help students research topics using a large data file
   - Provide reinforcement for concepts introduced in the textbook
   - Encourage critical thinking — Students are given a problem to solve that requires them to make decisions about how to search for data, make comparisons and inferences, and classify and organize data.

Making Decks

Welcome to the *Information Laboratory for Chemistry*. Here you will find a collection of hundreds of data cards containing information about the elements, how chemical principles are applied in industry, as well as environmental chemistry and much more.

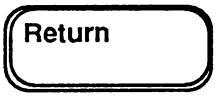
Because these data cards are part of a computer data base, you have the power to search through these cards in a variety of ways. Your explorations will allow you to review principles introduced in the textbook, guide you in expanding your understanding of certain topics, or provide you with a basis of research for a project or report.

To use the cards for a particular purpose, they can be arranged in decks. A deck is a group of related cards. Some decks are already arranged by topic, and can be sorted to include more or fewer cards, depending on your needs. You can even build your own decks from the card index.

This data base is a sophisticated and powerful tool that is easy to use, once you learn a few basic ideas and commands. The Tutorial will help you master the use of decks by taking you step by step through several different types of searches. You may wish to explore the program briefly on your own. Survey the headings below, and the margin hints, for ideas. You cannot hurt the program using the keyboard, so go ahead and experiment! Then work through the Tutorial, completing each step carefully to be sure that you have become familiar with all important parts of the program.

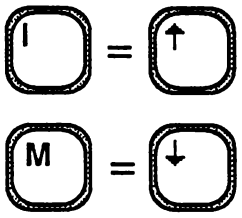
I. Getting Started

- Insert the System Disk (Side 1) into the computer's main drive to boot up the computer.
- When the screen tells you to INSERT DATA DISK, take out the System Disk and turn it over.
- Press **RETURN**.



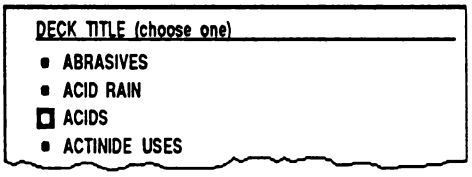
II. Selecting a SEARCH PATH

A search begins at the SEARCH PATHS menu. There are four ways to search for the decks or individual cards that you need. Take a brief look at each. You will use ↑ or ↓ to scroll through different choices on the list. Use **RETURN** to select your choice. Note: A few keyboards do not have arrow keys. Instead, use **I** for up and **M** for down.



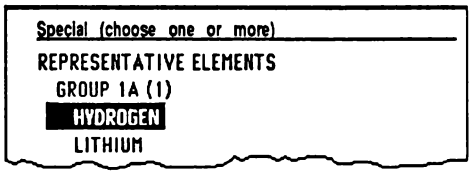
- Select the DECK TITLE search path using ↑ or ↓.
- Press **RETURN**.

The DECK TITLE search path is in the window. This search path lists all of the decks that are in the program. Notice that lists are arranged in alphabetical order.



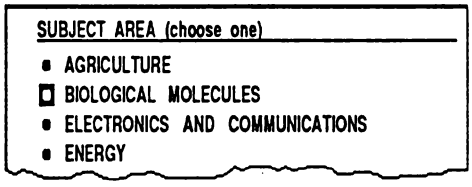
- Press **ESC** to return to the SEARCH PATHS menu.
- Select the SPECIAL search path.

The SPECIAL search path lists the elements by groups and periods. Use ↑ or ↓ to scroll through this list.



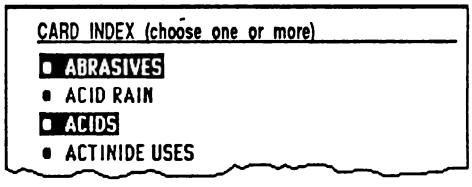
- Press **ESC** to return to the SEARCH PATHS menu.
- Select the SUBJECT AREA search path.

Listed are subject areas where applications of chemical principles can be found. When you choose a subject area, you can find information about that subject and many related subtopics.



- Return to the SEARCH PATHS menu.
- Select the CARD INDEX search path.

The CARD INDEX lists all of the cards in the program by title.



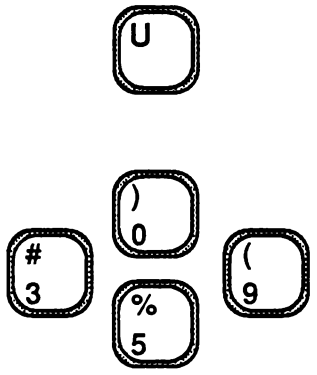
- Return to the SEARCH PATHS menu.

III. Selecting and Reading a Card From the DECK TITLE Search Path

This short search for information about CONTROL RODS will show you what kinds of information are found on each data card. You will also learn some faster ways to move through lists.

- Select the DECK TITLE search path.
- Press **D** to scroll down the list a screen at a time.

- Press **U** to scroll back up the list. Return to the beginning of the list.



Notice that you can scroll from the beginning of the list to the end by going up. Press **U** now to see ZINC at the end of this list.

- Press **5** to jump 50% through the list. Press **3** to take you 30% through the list. Press **0** to go to the beginning. You can use numbers **0** through **9** for this proportional scrolling. Try it!

- Move the cursor to CONTROL RODS on the list. Use proportional scrolling first, then **D** or **U**, then ↑ or ↓ as needed.

- Press **RETURN**.

The CONTROL RODS deck will be on the screen with the BORON card on top of the deck.

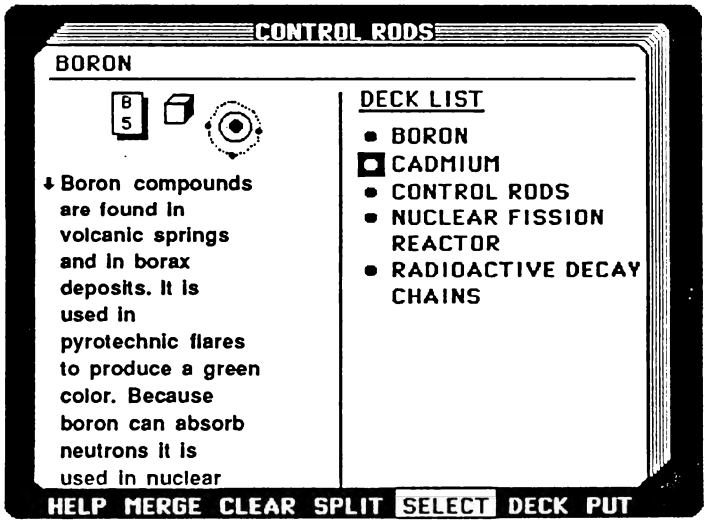
Find these four parts on the card:

1. Deck Title: at the top of the deck. This deck is called CONTROL RODS.

2. Card Title: in the upper left corner of the top card. This card is called BORON.

3. Text: on the left side of the card. It contains data for this card.

4. DECK LIST: on the right side of the card. It lists the names of all of the cards in this deck.



At the bottom of the screen is a menu of commands. Right now the highlighted command is SELECT, since you are selecting paths and cards. Later in this tutorial you will use other commands to sort decks and cards. But first, learn a little more about getting around on one card.

- Press the ; key. The cursor moves from the DECK LIST to the text area.
- Use ↑ or ↓ to scroll through the text.
- Press ; or **RETURN** to get back to the DECK LIST.

To make the text easier to read, you can extend the text across the card.

- Press **E** to extend the text across the card.
- Press **E** or **RETURN**. The cursor returns to the DECK LIST.

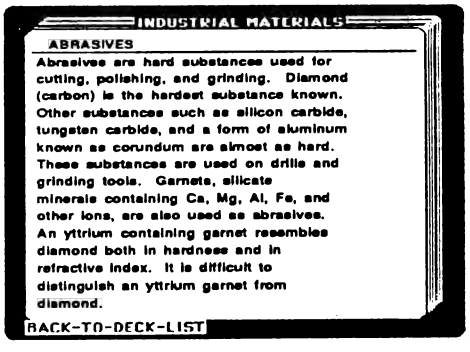
- Return to the SEARCH PATHS menu. Press **ESC**. When the message RETURN TO SEARCH PATHS? (YES/NO) appears, press **Y**.

IV. Selecting and Browsing a Deck From the SUBJECT AREA Path

Your first search involved just one card of one deck. Now do a search in which you browse through several cards in one deck.

- Select the SUBJECT AREA search path.
- Scroll to the SUBJECT AREA called INDUSTRIAL MATERIALS, using the ↓ key.
- Press **RETURN**.

The INDUSTRIAL MATERIALS deck will appear on the screen. with the ABRASIVES card on top of the deck. Use the two ways you know to see the whole card:



- Use the ; key to move the cursor to the text side of the card. Then scroll down to read the hidden part of the card. Use **RETURN** to return to DECK LIST.
- Use **E** to extend the text so that it all fits on one screen. Use **E** or **RETURN** to return to the DECK LIST. You may want information from other cards in the INDUSTRIAL MATERIALS deck.

There are two ways to put different cards on top of the deck:

1. Move the cursor through the DECK LIST until you can select the PLASTICS title. Press **RETURN** to display that card.

2. You can browse through some or all of the cards in the deck using the < and > keys. > brings up the next card in the DECK LIST, and < brings up the previous card. This also works when the text is extended. Try it, then return the ABRASIVES card to the top of the deck.

Return to the SEARCH PATHS menu.

V. Selecting From the SPECIAL Search Path or CARD INDEX Search Path

When you use either the SPECIAL or CARD INDEX search paths to make decks, you can make more than one selection from the list using the **SPACEBAR** and **RETURN**.

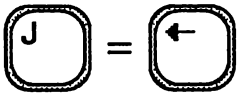
- Start at the SEARCH PATHS menu. Select SPECIAL.
- Use ↓ to move the cursor to GROUP 1A (1).
- Press **SPACEBAR** to highlight GROUP 1A (1).
- Use proportional scrolling until you can put the cursor on SILVER in GROUP 1B (11).
- Press **SPACEBAR** to highlight SILVER.
- Press **SPACEBAR** to remove the highlight.
- Press **SPACEBAR** to highlight SILVER again.
- Press **RETURN** to select the highlighted cards.

Notice that the DECK LIST contains the titles you chose: all the elements in Group 1A and silver. You can highlight as many areas as you wish to make a deck from this path.

VI. HELP

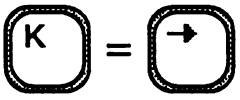
Onscreen help is available.

- Use ← to highlight HELP in the command menu at the bottom of the screen.
- Press **RETURN** for the HELP deck.



You can explore this deck like any other. Follow these steps to go back.

- Press **ESC** to return to previous position.
- Press → to highlight SELECT in the command menu before proceeding.



VII. Review

You have now worked through Part 1 of the Tutorial for the *Information Laboratory Software for Chemistry*. Check your knowledge:

1. Survey the headings for this Tutorial again. Also check the graphics in the margins.
2. Question yourself at each heading: "Do I know what these functions are?"
3. If you aren't sure, read again to refresh your memory.

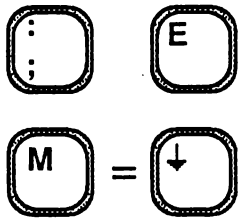
Working with Two Decks

In Part 1 of the Tutorial, you learned about the organization of this data base, and you learned the basic moves for getting around. In Part 2, you will learn new commands that will allow you to manipulate decks. By doing so, you will be able to organize data to get the most out of the available information.

I. Making Decks From DECK LISTS

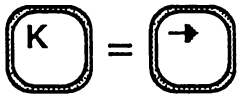
Suppose you want to learn more about the elements in plastics.

- Select the DECK TITLE search path. Select PLASTICS.
- Read the card. Press ; or **E** and then ↓ to read the whole card.
- Press **RETURN** to return to the list of cards in the PLASTICS deck.



Make a second deck with more information related to silicon

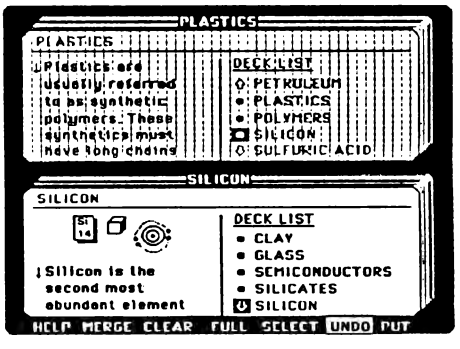
- Press ↓ to highlight SILICON.
- Press → to highlight DECK on the command menu.
- Press **RETURN** to make a deck about silicon.



II. Two Decks at Once: Active and Inactive

Whenever you make a deck from the DECK LIST the screen splits to display two decks, the deck you had first and the new deck. The new deck is active and the previous one is inactive. Each time you make a new deck, it replaces the inactive deck.

The inactive deck is filled with vertical lines, and the cursor is flashing in the active deck. The commands you choose from the menu at the bottom refer to the item or deck where the cursor is located. You can change which deck is active by pressing the **SPACEBAR**.

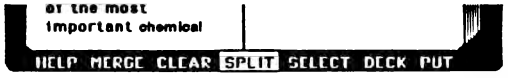


- Return to the DECK LIST in the active deck. Make a new deck called CARBON. It will replace the inactive deck and become active.

You can continue to make decks from the DECK LIST to discover new information and collect data.

III. Using the FULL and SPLIT Commands

By using the FULL command, you can make the active deck fill the window. Now press **E** to make it even easier to read. Later, use SPLIT to go back to the split window with two decks.



- Make the CARBON card fill the screen. Press ← to highlight FULL.
- Press **RETURN** to select FULL.
- Press **E** to extend the text across the screen.
- Return to the DECK LIST.
- Return to a split screen.

IV. To Delete Inactive Deck

Once there are two decks formed, you have to take an extra step when you return to SEARCH PATHS to start again. When you return to the SEARCH PATHS the active deck will be saved and the inactive deck deleted. You must confirm that this is what you want to do by answering the displayed question.

- Press **ESC**.
- Press **Y**.

- Press **Y** again if you want to delete the inactive deck. The active deck may be accessed later.
- Press **N** if you do not want to delete the inactive deck. This will give you a chance to use **SPACEBAR** to change which deck you want to remain active.

V. Review

Go back to review the headings and margin notes in this section of the Tutorial. Ask yourself if you know how to use each function. Repeat any sections that are not clear.

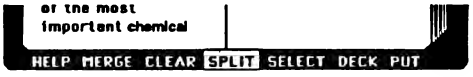
You are now ready to begin further exploration of this data base.You may begin with one of the search sheets to guide some of your explorations, or you may go on to the advanced section of the Tutorial. You may also have an opportunity to use this research tool in your own way.

Advanced Commands

You have probably noticed other options on the command menu at the bottom of the screen. These can be used to arrange cards for easier comparisons or to gather cards of interest from different decks into one single deck.

I. Using the SPLIT, CLEAR, and UNDO Commands

- Select the DECK TITLE search path.
- Use **SPACEBAR** to highlight GROUP 2A .
- Press **RETURN**.
- Highlight SPLIT on the command menu.



- Press **RETURN**.

The screen will be split. The active deck is the one you just selected. The inactive deck will be leftover from your last search, or will be empty if you started from the beginning. You can clear the inactive deck of old cards to make your own custom deck. If the inactive deck is already clear, skip the next few steps and begin Section II below.

- Press **SPACEBAR** to make the leftover deck active.
- Highlight CLEAR on the menu and press **RETURN**.

Notice that a new choice appears on the menu, called UNDO. Use this if you accidentally cleared the wrong deck. Just press **RETURN** to back up one step. Remember, CLEAR will clear the active deck.

II. Comparing Cards Using the PUT Command

You can place two cards on the split screen at the same time to compare them. You always PUT from the active deck into the inactive deck. Try comparing BERYLLIUM with MAGNESIUM.

- Move the cursor to BERYLLIUM.
- Highlight PUT in the command menu.

- Press **RETURN**.

The BERYLLIUM card will move to the inactive deck.

- Keep the GROUP 2A (2) deck active.
- Highlight SELECT in the menu.
- Move the cursor to MAGNESIUM.
- Press **RETURN.**

Now that the two cards you want to compare are visible in the windows, you can extend the text on each to make them easier to compare.

Always remember to check the command menu at the bottom to see that your choice of commands is highlighted. All commands affect the active deck.

III. Building a Custom Deck with the PUT Command

You can gather cards of interest from different decks and put them into one. Think of one deck as your storage deck. The other will be your search deck.

- When you PUT a card into your storage deck, you will PUT from the active deck, so your storage deck must be inactive.
- When you return to the SEARCH PATHS to get a new deck to search, your storage deck must be active, since the inactive deck will be deleted.

This will take a little practice, but is a useful way to gather notes for a report. Try it! See if you can put several cards from different decks into one storage deck. Keep your eye on the command menu and pay attention to which deck is active, depending on your choice of commands. If you get confused, you can press **ESC** and start over.

IV. Using the MERGE Command

You might want to combine all of the cards of one deck with another. Using MERGE will combine the two decks that are in the windows. The inactive deck will disappear as it merges into the active deck. Try it!

Printing

You can print data you have gathered. You can print just one card, a whole deck, or a list of the cards in a deck. Print commands affect only the active deck.

- Create a deck with three cards in it. Use any approach you want to get three cards that have something in common.
- Hold down **CONTROL** and press **P**.

new menu will appear at the bottom of the screen. Use the → key to select what you want to print.

- Print your whole deck.
- On the bottom of your printout, use a pen or pencil to write what these three cards have in common.

You can print data cards at any time. You do not need to return to the SEARCH PATHS or wait until you have completed a search. Just be sure that the printer is connected to the computer and that the printer is ready to print.

Note: The subscripts in the chemical formulas will not print out as numbers.

Special Keys

Cursor Controls

I = ↑ Move cursor up in list

M = ↓ Move cursor down in list

D Move cursor to top of next screen

U Move cursor to top of previous screen

) 0 - (9 Move cursor down a percentage of list

Shift + ! 1 - (9
Move cursor down a number of pages

Command Keys

Return Execute a command

Esc Return to search path menu or previous menu

Spacebar
Highlight title choices in Card Index and Special Search Paths
Change inactive deck to active in Split Screen mode

Control + S Turn sound on/off

Text Display

> . Display next card

< , Display previous card

: ; Move cursor to/from text window

E Expand text window

Menu Commands

J = ← Move highlight right in menu bar

K = → Move highlight left in menu bar

Help Display Help deck
Merge Combine both decks
Clear Clear active deck
Split Display both decks
Full Display active deck on full screen
Select Select a search path, deck, or card from list
Deck Create a new deck
Put Move card from active to inactive deck

Control + P Display Print Menu

Subject Areas and Topics

Subject Area

Agriculture
Biological Molecules
Electronics and Communications
Energy
Environmental Chemistry
Geographic Distribution of Minerals
Industrial Materials
Metals in Industry
Periodic Table
Radioactivity

Topics

Glossary

Active Card — The card on top of the active deck. A new deck can be made from the active card.

Active Deck — The deck that can be used. When there are two decks on the screen, the cursor is blinking in the active deck.

Backup Disk — An extra copy of a disk. The backup disk should be stored safely as a precaution against losing time and money in case the primary disk is damaged.

Browse — To examine the cards of a deck or deck list.

Card Index Search Path — A predefined sort of the Information Laboratory data base by card titles. The data cards are listed alphabetically. One or several cards may be chosen.

Clear — An Information Laboratory menu command that removes a card or deck of cards from the screen.

Control Key — A key that, when pressed with a regular keyboard key, activates a command.

Cursor — In the Information Laboratory, the cursor is the blinking symbol that indicates the item that can be selected.

Data Base — A collection of data accessible to a computer.

Data Card — In the Information Laboratory a screen of text that contains data on a particular subject.

Deck — **1.** A group of data cards. **2.** An Information Laboratory menu command that creates a new deck of cards from the card selected in the deck list.

Deck List — The list of the cards in a deck. The deck list appears on the right side of a data card.

Deck Title Search Path — A predefined sort of the Information Laboratory data base by deck titles. The deck titles are listed alphabetically. Only one deck title at a time may be selected from this search path. The selected deck consists of the chosen deck title and related cards.

Disk — A device that stores data.

Disk Drive — A peripheral component of a computer that reads and may write data to a disk.

Full — An Information Laboratory menu command that fills the entire screen with the active deck.

Help — A menu command that activates a card which gives assistance in using the Information Laboratory.

Inactive Deck	The deck that cannot be used. When there is a split screen the inactive deck has vertical lines through it.
Menu	A list of operations a program can perform.
Merge	An Information Laboratory menu command that combines the inactive deck with the active deck.
Put	An Information Laboratory menu command that moves a selected card from the active deck into the inactive deck.
Scroll	Moving through a list or text.
Search Path	**1.** A predefined sort of the Information Laboratory data base. **2.** A menu that lists the search paths.
Select	An Information Laboratory menu command that activates a card or search path and places it on the screen.
Sort	**1.** The process of arranging data in a defined order. **2.** Arranging data items from a data base on a conditional basis.
Special	A predefined sort of the Information Laboratory listing the elements in the data base arranged in groups like the periodic table.
Split	An Information Laboratory menu command that splits the monitor screen into two decks.
Split Screen	A screen with two decks on it.
Subject Area Search Path	A predefined sort of the Information Laboratory data base by major subject headings. The subject titles are listed alphabetically. Only one subject title at a time may be selected from this search path. The selected deck consists of the chosen subject title and related cards.
System Disk	The disk that contains the program.
Text Window	The area of a data card that contains the subject matter of the card.
Undo	An Information Laboratory menu command that cancels the previous menu command and restores the previous screen.

Addison-Wesley

Information Laboratory Software

Chemistry

Searchsheets

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Contents

Searchsheets

Name _____ Class _____ Date _____

Searchsheet 1

Information Laboratory Software for Chemistry

Ancient Elements

Problem

You are a metal worker in 500 AD. You have been asked to forge a saw and a metal vase. Based on the materials known to metal workers in 500 AD, which materials would you suggest?

Sources

Here are listings that you may want to consider as sources of information. Blanks are provided to list other important card titles you discover.

bronze _____ _____ _____

gold _____ _____ _____

ancient elements _____ _____ _____

Related Questions

The answers to these questions will be helpful in making a choice.

1. What are the properties of iron? _____
2. What are the properties of gold? _____
3. What are the properties of bronze? _____
4. What do you need to have to produce steel? _____

Your Decision

What materials did you decide to use for the saw and the vase? Explain how the properties of each material make it appropriate for the tasks.

Name _____ Class _____ Date _____

Searchsheet 2

Information Laboratory Software for Chemistry

Abrasives

Problem

You just received an order for a synthetic abrasive. You are not able to procure any of the Group 4A elements, or nitrogen. You have a supply of boron and phosphorous. Do you think you could manufacture an abrasive and fill the order?

Sources

Here are listings that you may want to consider as sources of information. Blanks are provided to list other important card titles you discover.

abrasives _____ _____ _____

group 3A _____ _____ _____

group 4A _____ _____ _____

Related Questions

The answers to these questions will be helpful in making a choice.

1. What are the properties of an abrasive? _____

2. What kind of bonds are formed in diamond crystals? _____

3. How many electrons are in the outer shell of nitrogen? _____

4. How many electrons are in the outer shell of phosphorous? _____

Your Decision

What did you decide? Will you be able to manufacture an abrasive? Give your reasons why the company should accept this order or why they should not accept the order.

Name _____ Class _____ Date _____

Searchsheet 3

Information Laboratory Software for Chemistry

Nutrition

Problem

You have space to ship salt and one other type of food to people who are starving because of a drought. You have a choice of whole grain cereal, processed sugar, or fruit. Which food would you choose? Why is it important to ship these two food sources immediately?

Sources

Here are listings that you may want to consider as sources of information. Blanks are provided to list other important card titles you discover.

nutrition chemistry _____ _____ _____

biological molecules _____ _____ _____

food _____ _____ _____

Related Questions

The answers to these questions will be helpful in making a choice.

1. Why are proteins important? _____
2. What is the importance of food? _____
3. What is an electrolyte? _____
4. What part do ions play in the human body? _____
5. Which biological molecules store energy? _____

Your Decision

What did you choose to send in your first shipment? Give your reasons why you should send these foods first.

Name _____ Class _____ Date _____

Searchsheet 4

Information Laboratory Software for Chemistry

Atomic Structure

Problem

Over 2000 years ago some Greek philosophers believed that all matter was made of a combination of earth, fire, water, and air. How do scientists describe the structure of matter today?

Sources

Here are listings that you may want to consider as sources of information. Blanks are provided to list other important card titles you discover.

proton _____ _____ _____

electron _____ _____ _____

neutron _____ _____ _____

Related Questions

The answers to these questions will be helpful in answering the question.

1. How do electrons in atoms help to explain ions? _____
2. Can you see any evidence of electrons, protons, or neutrons around you? _____
3. What makes one element different from another? _____
4. How can you tell that earth, fire, water, and air aren't really elements? _____

Your Decision

How do scientists describe the structure of matter today? List any evidence that you have that this is true.

Name _____ Class _____ Date _____

Searchsheet 5

Information Laboratory Software for Chemistry

Ores

Problem

Your Smelting Plant has the opportunity to purify either bauxite (aluminum ore) or copper ore. You also have contracts to sell by-products to either a fertilizer manufacturer or to the steel industry. Which ore would it be best to process?

Sources

Here are listings that you may want to consider as sources of information. Blanks are provided to list other important card titles you discover.

fertilizers _____ _____ _____

copper smelting _____ _____ _____

aluminum manufacture _____ _____ _____

Related Questions

The answers to these questions will be helpful in making a choice.

1. What are the by-products of copper smelting? _____
2. How are the by-products used? _____
3. What are the by-products of bauxite purification? _____
4. What is steel made from? _____
5. How are superphosphate fertilizers made? _____

Your Decision

Which ore did you decide would provide the greatest business opportunity for the smelting plant to purify? Tell why and explain how it would effect the sales of by-products.

Name _____ Class _____ Date _____

Searchsheet 6

Information Laboratory Software for Chemistry

Acid Rain

Problem

Tests on the water in a lake show the pH to be 5.0. Tests show that most of the acid in the lake is carbonic acid, but there are traces of nitric acid as well. Do you think that the pH reading is a cause for concern?

Sources

Here are card titles in the Information Laboratory Software that you may want to consider as sources. Blanks are provided to list other important card titles you discover.

acid rain _____ _____ _____

nitric acid _____ _____ _____

smog _____ _____ _____

Related Questions

The answers to these questions will be helpful in making a choice.

1. What is the normal pH for lakes? _____

2. What are the effects of acid rain? _____

3. How would nitric acid get into a lake? _____

4. How does nitric acid get into the atmosphere? _____

Your Decision

Do you think the pH reading is a cause for concern? What other indicators could help you make a decision?

Name _____ Class _____ Date _____

Searchsheet 7

Information Laboratory Software for Chemistry

Corrosion

Problem

A large iron bridge has been built near the coastline. Engineers have been asked to identify bridge maintenance. What is probably the biggest cause of deterioration in a coastal environment? What should they suggest to slow deterioration?

Sources

Here are listings that you may want to consider as sources of information. Blanks are provided to list other important card titles you discover.

iron _____ _____ _____

electrolytes _____ _____ _____

metal coating _____ _____ _____

Related Questions

The answers to these questions will be helpful in making a choice.

1. What causes iron to deteriorate? _____
2. What is an electrolyte? _____
3. How are metal coatings used? _____
4. Name any metal pigments that are important in metal protection. _____
5. Which alloys are resistant to corrosion? _____

Your Decision

What is probably the cause of deterioration? What maintenance steps did you suggest? Explain how the steps should slow deterioration.

Name _____ Class _____ Date _____

Searchsheet 8

Information Laboratory Software for Chemistry

Fossil Fuels

Problem

An author is writing a short story about the future. In the story readers are to imagine a world that does not use fossil fuels for manufacturing or transportation. Many of the things we notice everyday would be different in that world. What do you think the author would describe?

Sources

Here are listings that you may want to consider as sources of information. Blanks are provided to list other important card titles you discover.

industrial materials _____ _____ _____

fossil fuels _____ _____ _____

environmental chemistry _____ _____ _____

Related Questions

The answers to these questions will be helpful in making a choice.

1. How are fluorocarbon polymers used? _____
2. Name some composites. _____
3. Are fossil fuels important to fertilizer manufacture? _____
4. What is the greenhouse effect? _____
5. What are the products of fossil fuel combustion? _____

Your Decision

How do you think the author would describe everyday life in a world without fossil fuels? Write your own description or make a list of the contrasting conditions.

Name _____ Class _____ Date _____

Searchsheet 9

Information Laboratory Software for Chemistry

Distribution of the Elements

Problem

You are in charge of locating all of the elements that are necessary to make the materials that are in the space shuttle. You have located all the elements you need except copper, beryllium, and manganese. Is it possible to build this spacecraft without importing any of these elements?

Sources

Here are listings that you may want to consider as sources of information. Blanks are provided to list other important card titles you discover.

copper _____ _____ _____

beryllium _____ _____ _____

manganese _____ _____ _____

Related Questions

The answers to these questions will be helpful in making a choice.

1. Where is manganese produced? _____

2. Where is beryllium mined? _____

3. Where are important copper deposits found? _____

Your Decision

Could you find all of the missing elements for the space ship as natural resources within the United States? What country or countries would you buy the other elements from? Give reasons for your choice.

Name _____ Class _____ Date _____

Searchsheet 10

Information Laboratory Software for Chemistry

Noble Gases

Problem

You are helping a junior high school student with a science fair project on the noble gases. The student wants information on the uses of the noble gases. What specific areas and applications would you recommend be included?

Sources

Here are listings that you may want to consider as sources of information. Blanks are provided to list other important card titles you discover.

group 0 _____ _____ _____

oxides _____ _____ _____

lasers _____ _____ _____

Related Questions

The answers to these questions will be helpful in making a choice.

1. What are the noble gases? _____

2. Where are noble gases found? _____

3. Why don't noble gases react with other elements? _____

Your Decision

What will you recommend to the student? List the different noble gases and the uses you found for them.

Name _____ Class _____ Date _____

Searchsheet 11

Information Laboratory Software for Chemistry

Conductors

Problem

You must identify and recommend a conductor for underground transmission of electricity. You must provide the most efficient lines possible, but you are on a limited budget. What material would you choose?

Sources

Here are listings that you may want to consider as sources of information. Blanks are provided to list other important card titles you discover.

electrical conductors _____ _____ _____

superconductors _____ _____ _____

corrosion resistance _____ _____ _____

Related Questions

The answers to these questions will be helpful in making a choice.

1. What is an electrical conductor? _____
2. Name some corrosion resistant metals. _____
3. Why is it useful to have superconductors? _____
4. What makes modern superconductors practical? _____
5. How does electrical resistance affect efficiency? _____

Your Decision

What material did you identify? Which one did you recommend? Explain why you think that material was best for underground transmission.

Name _____ Class _____ Date _____

Searchsheet 12

Information Laboratory Software for Chemistry

Periodic Trends

Problem

You are a chemist in the 1820's. You are presented with what you believe to be a new element. You must decide where in the periodic table it belongs. Since you don't have the ability to find out how many electrons it has you must base your decision on trends in the periodic table. Your element will combine with chlorine in a 2 to 1 ratio. (Twice as much chlorine as your element.) You also know that your element is about as heavy as gold. In what group do you expect to find your element? Give an estimate of which row it would be in.

Sources

Here are listings that you may want to consider as sources of information. Blanks are provided to list other important card titles you discover.

groups _____ _____ _____

periodic table _____ _____ _____

periodic trends _____ _____ _____

Related Questions

The answers to these questions will be helpful in making a choice.

1. What is a group? _____

2. What is electronegativity? _____

3. Describe the trend in atomic weights of the elements on the periodic table. _____

Your Decision

Where did you place your element? Explain your reasons for placing your element where you did.

Name _____ Class _____ Date _____

Searchsheet 13

Information Laboratory Software for Chemistry

Bonds

Problem

You are the curator of historic houses in a small European city. You need to set priorities for the restoration of an old building. Water and acid rain are polar solvents. They dissolve ionic compounds more readily than covalently bonded ones. Based on this fact categorize the parts of the building and decide which of the following parts should be preserved first. The exposed parts of the building are wooden window sills, an ornate iron fence, and some marble columns.

Sources

Here are listings that you may want to consider as sources of information. Blanks are provided to list other important card titles you discover.

bonds _____ _____ _____

carbonates _____ _____ _____

solvent _____ _____ _____

Related Questions

The answers to these questions will be helpful in making a choice.

1. How do materials dissolve? _____
2. What compounds are in marble? _____
3. Is iron ionically bonded? _____
4. Is wood made of organic compounds? _____

Your Decision

Based on comparisons of ionic and covalent bonding, on what part of the house would you concentrate your restoration effort? Explain why you decided on this part.

Name _____ Class _____ Date _____

Searchsheet 14

Information Laboratory Software for Chemistry

Elements in the Earth

Problem

An old folk saying is that we are all made of stardust. There can be a lot of wisdom in folk sayings. Do you think this one is true?

Sources

Here are card titles in the Information Laboratory Software that you may want to consider as sources. Blanks are provided to list other important card titles you discover.

elements in the earth's crust _____ _____ _____

fusion _____ _____ _____

earth's core _____ _____ _____

Related Questions

The answers to these questions will be helpful in making a choice.

1. What elements make up 99% of the earth's crust? _____
2. What type of elements are in the earth's core? _____
3. What elements make up 99% of the human body? _____
4. What happens in a supernova explosion? _____
5. What will happen when the sun runs out of hydrogen fuel? _____

Your Decision

How would you explain this folk saying? What supporting evidence did you find that could relate to our being made of stardust?

Name _____ Class _____ Date _____

Searchsheet 15

Information Laboratory Software for Chemistry

Water

Problem

It is a very dry summer and you are attempting to purify ocean water for human consumption. After you study the process, you will be asked if the process should be recommended as a large scale source of fresh water. What will you recommend?

Sources

Here are listings that you may want to consider as sources of information. Blanks are provided to list other important card titles you discover.

chlorine _____ _____ _____

ocean _____ _____ _____

water _____ _____ _____

Related Questions

The answers to these questions will be helpful in making a choice.

1. Why is water such a good solvent? _____
2. Can completely pure water be made? _____
3. Why does water dissolve salt so readily? _____
4. Which elements must be removed from the ocean water? _____

Your Decision

What is your decision? Make your recommendation and list ways ocean water might be purified for drinking water on a large scale or explain why it might be impractical.

Name _____ Class _____ Date _____

Searchsheet 16

Information Laboratory Software for Chemistry

Fossil Fuel Pollution

Problem

You live in a small rural town. Is the law requiring smog devices (catalytic converters) in cars important to your town? Should it be repealed or strengthened?

Sources

Here are card titles in the Information Laboratory Software that you may want to consider as sources. Blanks are provided to list other important card titles you discover.

catalytic converters _____ _____ _____

fossil fuel combustion _____ _____ _____

photochemical reactions _____ _____ _____

Related Questions

The answers to these questions will be helpful in making a choice.

1. What are some products of fossil fuel combustion? _____

2. How are catalytic converters used? _____

3. What are the most important components of photochemical smog? _____

Your Decision

What is your decision? Should the law be repealed or strengthened? Support your reasons with information you collected.

Name _____ Class _____ Date _____

Searchsheet 17

Information Laboratory Software for Chemistry

Alloys

Problem

There is a need for a magnetic high-speed steel drill. As a member of a research team you must decide on three elements to add to iron to make the steel. The only elements available are chromium, cobalt, nickel, and tungsten. Which elements would you add?

Sources

Here are card titles in the Information Laboratory Software that you may want to consider as sources. Blanks are provided to list other important card titles you discover.

refractories _____ _____ _____

steel _____ _____ _____

group 8B _____ _____ _____

Related Questions

The answers to these questions will be helpful in making a choice.

1. Is iron the only magnetic element? _____
2. What determines the properties of steel? _____
3. What kind of stresses does a high speed drill need to withstand? _____

Your Decision

What elements did you choose? Explain the properties each one would impart to the steel and why those properties are important.

Name _____ Class _____ Date _____

Searchsheet 18

Information Laboratory Software for Chemistry

Acids and Bases

Problem

You need to remove a grease stain from a cotton rug. You have sulfuric acid and caustic soda available. Which one would you use? What notes of caution to the user would you suggest?

Sources

Here are card titles in the Information Laboratory Software that you may want to consider as sources. Blanks are provided to list other important card titles you discover.

fats _____ _____ _____

Bronsted-Lowry concept _____ _____ _____

concentration _____ _____ _____

Related Questions

The answers to these questions will be helpful in making a choice.

1. What molecules are fats made of? _____

2. How would you make a weak solution ? _____

3. What is sulfuric acid used for? _____

4. What is caustic soda used for? _____

5. Are acids caustic? _____

Your Decision

What did you choose to remove the grease stain? Why did you choose it? Write the notes of caution that you would give.

Name _____ Class _____ Date _____

Searchsheet 19

Information Laboratory Software for Chemistry

Batteries

Problem

You are to provide electrical energy for a car of the future. The energy should be from sources that have little effect on the environment and are available. Would you choose an aluminum battery, a photovoltaic cell, a fuel cell, or some other type?

Sources

Here are listings that you may want to consider as sources of information. Blanks are provided to list other important card titles you discover.

batteries _____ _____ _____

fossil fuels _____ _____ _____

modern materials in cars _____ _____ _____

Related Questions

The answers to these questions will be helpful in making a choice.

1. Is it expensive to produce aluminum? _____
2. How have fuel cells been used? _____
3. What kind of a fuel is methanol? _____
4. Does sulfuric acid pollute the environment? _____
5. How is solar energy converted to electrical energy? _____

Your Decision

What choice did you make? Give the reasons for the choice you made. Tell what effects it would have on the environment and where you would get the materials to manufacture it.

Name _____ Class _____ Date _____

Searchsheet 20

Information Laboratory Software for Chemistry

Combustion

Problem

You are on the moon. You have paper, wood, and matches. What are you missing for starting a fire? How might you provide the missing ingredient?

Sources

Here are card titles in the Information Laboratory Software that you may want to consider as sources. Blanks are provided to list other important card titles you discover.

combustion _____ _____ _____

photosynthesis _____ _____ _____

fuel cells _____ _____ _____

Related Questions

The answers to these questions will be helpful in making a choice.

1. What kind of a reaction is combustion? _____

2. How do fuel cells work? _____

3. What is the reaction in photosynthesis ? _____

Your Decision

What is the missing ingredient? What means would you use to supply it?

Name _____ Class _____ Date _____

Searchsheet 21

Information Laboratory Software for Chemistry

Electrochemistry

Problem

Imagine that you are tiny and sitting on the cathode of a zinc-silver battery. All around you electrons are moving. Report what you see and how the metal is changing.

Sources

Here are listings that you may want to consider as sources of information. Blanks are provided to list other important card titles you discover.

anode _____ _____ _____

electroplating _____ _____ _____

oxidation _____ _____ _____

Related Questions

The answers to these questions will be helpful in making a choice.

1. Do all batteries have oxidation? _____
2. What does a salt bridge do? _____
3. How are ions important in this situation? _____
4. What reaction occurs at the cathode? _____

Your Decision

What will you report? Is the amount of solid metal around you increasing or decreasing? Explain why this is happening.

Name _____ Class _____ Date _____

Searchsheet 22

Information Laboratory Software for Chemistry

Heavy Metals

Problem

The children in a very old small school have developed an unusual loss of appetite and energy. School officials suspect that peeling paint is causing the problem. Is the paint pigment at fault? What paint pigment would you suggest as an alternative?

Sources

Here are listings that you may want to consider as sources of information. Blanks are provided to list other important card titles you discover.

toxic substances _____ _____ _____

lead _____ _____ _____

metal pigments _____ _____ _____

Related Questions

The answers to these questions will be helpful in making a choice.

1. What are the symptoms of lead poisoning? _____

2. Why did the school officials suspect the peeling paint? _____

3. What are some uses of metal pigments? _____

Your Decision

What paint pigment do you recommend the school district use to repaint? Explain your answer.

Name _____ Class _____ Date _____

Searchsheet 23

Information Laboratory Software for Chemistry

Nuclear Reactors

Problem

The designers of a nuclear power plant have recommended eliminating the cadmium control rods from the plant because cadmium is a pollutant. Would you suggest eliminating the control rod completely, using cadmium rods, or substituting some other type of material?

Sources

Here are listings that you may want to consider as sources of information. Blanks are provided to list other important card titles you discover.

nuclear reactors _____ _____ _____

fissile isotopes _____ _____ _____

control rods _____ _____ _____

Related Questions

The answers to these questions will be helpful in making a choice.

1. What does a control rod do? _____
2. What does the coolant do in a nuclear reactor? _____
3. What does a moderator do ? _____
4. Is cadmium a pollutant? _____

Your Decision

What is your recommendation to the designers? Give the reasons why you decided to eliminate or use the cadmium control rods, or explain the use of your substitute type of material.

Name _____ Class _____ Date _____

Searchsheet 24

Information Laboratory Software for Chemistry

Radioactive Waste

Problem

Various state governments have been asked to accept radioactive waste from nuclear power plants. As a State Representative, will you vote to accept or reject nuclear waste in your state?

Sources

Here are listings that you may want to consider as sources of information. Blanks are provided to list other important card titles you discover.

radioactive waste _____ _____ _____

radioactive decay chains _____ _____ _____

radiation effects on humans _____ _____ _____

Related Questions

The answers to these questions will be helpful in making a choice.

1. What kind of radioactive material is used in nuclear power plants? _____

2. What are the decay products that you will probably be asked to accept? _____

3. Why is the half-life of radioactive isotopes important in this issue? _____

Your Decision

Will you accept or reject the radioactive waste? List the reasons for your decision that you will report to the local newspapers.

Name _____ Class _____ Date _____

Searchsheet 25

Information Laboratory Software for Chemistry

Biological Molecules

Problem

Imagine that you are an alien being. You discover the earth on one of your exploratory passes through the different solar systems in our galaxy. On earth you find many life forms. They contain useful elements and compounds that are needed in your home solar system. You need the elements: nitrogen, iron, silicon; and the compounds: waxes and amino acids. Could you harvest these life forms to meet your needs?

Sources

Here are listings that you may want to consider as sources of information. Blanks are provided to list other important card titles you discover.

biological molecules _____ _____ _____

iron _____ _____ _____

enzymes _____ _____ _____

Related Questions

The answers to these questions will be helpful in making a choice.

1. Do any organisms have silicon in them? _____
2. What are biological molecules? _____
3. What elements are necessary to make carbohydrates? _____
4. Which compounds are lipids? _____

Your Decision

Could you harvest life forms on earth to meet your needs? Which organisms would you harvest? Explain why you chose the ones you did.

Name _____ Class _____ Date _____

Searchsheet 26

Information Laboratory Software for Chemistry

Photography

Problem

You have been given a grant to record the images of actual pages of rare books. Would you choose to use photography equipment or a photocopy machine?

Sources

Here are card titles in the Information Laboratory Software that you may want to consider as sources. Blanks are provided to list other important card titles you discover.

photography _____ _____ _____

photocopy machine _____ _____ _____

_____ _____ _____

Related Questions

The answers to these questions will be helpful in making a choice.

1. What elements are used in photography? _____

2. What process is used in a photocopy machine? _____

3. What supplies are needed to photocopy? _____

Your Decision

What equipment would you choose? Explain how this equipment would give you the best results.

Searchsheet Answers

Information Laboratory Software for Chemistry

1 Ancient Elements

Related Questions

1. magnetic, corrodes easily, conductive
2. malleable, conductive, ductile
3. hardness
4. iron, carbon, and varying amounts of other mettalic elements like Cr, Ni, Mn, Si, V, W

Your Decision

Answers will vary. Bronze or iron could be selected for hardness for the saw, gold for formability for the vase.

2 Abrasives

Related Questions

1. they are very hard
2. covalent
3. 5
4. 5

Your Decision

You might be able to use boron and phosphorous. The BP abrasive releases toxic fumes when exposed to water or acid.

3 Nutrition

Related Questions

1. enzymes / structures
2. provides raw materials and energy
3. an ionic solution
4. control pressure and electrical charge
5. ATP, sugar, carbohydrates, fats

Your Decision

Sugar for quick energy. However, whole grain cereal would have the most nutritional value. It would provide energy and protein. The salt is necessary to balance the electrolytes.

4 Atomic Structure

Related Questions

1. a different number of electrons than protons will produce a charged atom, or ion
2. radioactivity, electricity
3. the number of protons in the nucleus
4. they can all be separated into other substances by physical and chemical means

Your Decision

Evidence of these charged particles can be found by rubbing a balloon on your hair, and then watching the attraction between your hair and the balloon. New evidence from high-energy atom smashers suggests that there may be dozens of smaller particles in the nucleus.

5 Ores

Related Questions

1. lead, arsenic, selenium, sulfur dioxide
2. sulfur dioxide used to make sulfuric acids
3. iron-silica
4. an alloy of iron and carbon and other metals i.e., chromium, nickel, magnesium
5. the phosphate mineral is treated with sulfuric acid

Your Decision

You could choose either. Copper would give sulfuric acid for fertilizer manufacture. The bauxite purification produces iron oxide. Iron oxide is not a good source of iron.

6 Acid Rain

Related Questions

1. 5.7
2. fish die, inhibits egg development, damages plants
3. from acid rain
4. from NO emissions from autos and industry

Your Decision

Yes, it is slightly lower than normal. The nitric acid is an indicator. Carbonic acid is normal. Dying fish, less birds and fish hatching, plant disease are indicators of acid rain pollution, also.

Searchsheet Answers

Information Laboratory Software for Chemistry

7 Corrosion

Related Questions

1. corrosion
2. an ionic compound
3. to minimize corrosion
4. zinc chromate
5. stainless steel, aluminum

Your Decision

Salt in the air will cause corrosion. Painting the bridge with organic paint or zinc chromate would resist corrosion.

8 Fossil Fuels

Related Questions

1. application requiring stability over large temperature changes, low friction, and non-reactivity
2. fiberglass, plywood, belted tires, laminates, etc.
3. yes
4. warming of the earth caused by excessive CO_2 from fossil fuel combustion that traps global heat
5. carbon dioxide plus smaller amounts of sulfur, hydrogen, and mineral compounds

Your Decision

Answers can vary greatly. There will be no plastic products-ie. bottles, clothes, etc. Agriculture will use organic fertilizers. There will be less smog and temperatures may be lower.

9 Distribution of the Elements

Related Questions

1. USSR, South Africa, Brazil, Australia
2. South Africa, Zimbabwe, Brazil, Argentina, India
3. US, Zaire, Zambia, USSR, Chile, Peru

Your Decision

No, Brazil or South Africa would have the missing elements. The decision is subjective and may call on social or political factors.

10 Noble Gases

Related Questions

1. very stable, unreactive elements belonging to group 0
2. usually in the atmosphere
3. because of filled, stable, outer electron configurations

Your Decision

Argon-arc welding and light bulbs. Helium-lighter than air balloons. Krypton-photo flashbulbs, Al welding. Neon-neon signs. Xenon-flash bulbs and welding. Radon-radioactive cancer treatment medication.

11 Conductors

Related Questions

1. a material that conducts electricity
2. copper, silver, gold, platinum
3. power transmission without energy loss, smaller computers
4. new ceramic materials are superconductive at much higher temperatures
5. it would slow the electrons

Your Decision

Could choose any number of conductors, i.e., copper is less expensive than silver. Superconductors are being developed for underground transmission and would be efficient, but might be costly.

12 Periodic Trends

Related Questions

1. a collection of elements with similar chemical properties and outer structures
2. a measure of an atom's attraction for electrons in a chemical bond
3. atomic weights increase as we go down and to the right on the periodic table

Your Decision

period 6, group 6B or 2A

Searchsheet Answers

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13 Bonds

Related Questions

1. materials dissolve when the bonds between their atoms and molecules are broken by interactions with the atoms and molecules in a solvent
2. calcium, carbon, oxygen
3. no
4. yes

Your Decision

Limestone columns would ionically deteriorate in acid rain conditions first. The iron would rust, and wood would fill with water and rot.

14 Elements in the Earth

Related Questions

1. hydrogen, oxygen, aluminum, silicon, sodium, magnesium, carbon, fluorine, sulfur, phosphorous, potassium
2. iron, nickel
3. carbon, hydrogen, nitrogen, oxygen
4. a large dying star explodes and creates heavy elements like uranium
5. the helium will fuse into heavier elements

Your Decision

There is a theory that the solar system is formed from the dust of ancient stars. Thermonuclear fusion reactions show that elements fuse. Red giants are made of products of helium fusion. Therefore, C, O, H, and N, the main components of the human body, are formed in stars.

15 Water

Related Questions

1. because the polarity of the water molecule works to break the bonds of other polar molecules
2. yes
3. because salt is an ionic (polar) compound
4. Na, Cl, Mg, S, Ca, K, Br, B, Si, F

Your Decision

Salts are in solution so it is possible to distill ocean water. Ocean water is naturally distilled by precipitation. It may not be practical because of high energy use or cost of equipment.

16 Fossil Fuel Pollution

Related Questions

1. CO_2, CO, NOx, SO_2
2. industrial scrubbers, car engines
3. ozone, nitrogen oxides, hydrocarbons, SO_2

Your Decision

It should be kept or strengthened. Catalytic converters take the CO pollution from the engine exhaust. Another part of photochemical smog (N) could also be removed with improved converters.

17 Alloys

Related Questions

1. no
2. the amounts of iron and the impurities
3. heat or friction, tension

Your Decision

To make a light, tough, magnetic drill you could add cobalt and chromium. Tungsten would impart hardness and cobalt would increase magnetic properties. Tungsten withstands heat better but is heavier. Nickel is also magnetic.

18 Acids and Bases

Related Questions

1. fatty acids
2. add the acid to water
3. fertilizers, battery acid, petroleum manufacture
4. detergents, soap, manufacturing rayon
5. yes

Your Decision

The caustic soda would be the best choice as it is used in detergents with fatty acids. It would need to be a very dilute solution.

Searchsheet Answers

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19 Batteries

Related Questions
1. yes
2. in space craft
3. fossil
4. yes
5. photovoltaic cells

Your Decision
Any choice would be acceptable. Fuel cells are light and non-polluting, but use a fossil fuel. Aluminum uses a great deal of energy in its production and is fairly expensive to produce. A photovoltaic cell is used in space craft and uses solar energy. They are still in development stages.

20 Combustion

Related Questions
1. an oxidation-reduction reaction
2. electrochemical reactions which generate electrons through oxidation
3. carbon dioxide and water combine with the energy from sunlight to produce sugar and water

Your Decision
Oxygen. The method of supply is an open question. The student could bring plants that would produce the oxygen, or capture the oxygen from a fuel cell.

1 Electrochemistry

Related Questions
1. yes
2. carries charge to complete the circuit
3. ions carry the charge between the cathode and the anode
4. reduction

Your Decision
Increasing. The cathode is gaining electrons.

22 Heavy Metals

Related Questions
1. weakness, loss of appetite
2. peeling paint causes lead poisoning
3. paints for corrosion resistance, camouflage from sensory equipment.

Your Decision
Titanium has good covering power and is non-toxic.

23 Nuclear Reactors

Related Questions
1. absorbs neutrons when their concentration is too high
2. carries heat to the turbines
3. slows down neutrons for efficiency
4. yes

Your Decision
Keep the control rods-use Boron. Boron is used effectively in control rods. The neutron concentration could become dangerous and no other part would work.

24 Radioactive Waste

Related Questions
1. uranium-235 and plutonium-239
2. plutonium-239, strontium-90, cesium-137
3. it determines how long materials will still be radioactive

Your Decision
Answers will vary. Yes, if a way of disposing of the wastes is developed. The effects of radiation are serious and radioactivity is long lasting.

Searchsheet Answers

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25 Biological Molecules

Related Questions

1. equisetum, diatoms
2. molecules produced by living organisms
3. C, H, O
4. fats and waxes

Your Decision

You could harvest equisetum, a plant, for silicon; animals with blood for iron; most living organisms for nitrogen and amino acids. Waxes come from plant leaves.

26 Photography

Related Questions

1. silver, chlorine, bromine, iodine, sodium, sulfur, oxygen, potassium
2. electrostatic copying in response to light
3. ink, paper

Your Decision

Answers will vary. It would depend on cost, or on the condition of the book. Photocopying is less expensive and faster but hard on a book. Photography would give a better image and be easier on the book.